

ABSTRACT

Cooling systems and the methods of cooling filaments using the cooling systems are disclosed. One embodiment of the cooling system includes a layer of nozzles that spray air on the filaments above a pre-pad water spray. Alternatively, another cooling system utilizes air-atomizing nozzles to spray a mixture of air and water on the filaments.

The cooling systems provide an improved distribution of cooling fluid particulars to enhance the cooling of the filaments. The sprays from the nozzles have a higher momentum and are able to penetrate deeper into a filament than conventional cooling systems. The results are an improved temperature uniformity among the filaments and an overall reduction in temperature of the filaments prior to the application of size material.